CA 02315462 2002-08-14

SILECT
Translations & Communications

CERTIFICATION

We, SILECT Translations & Communications, a professional translation agency (accepted translation agency of the Government of Ontario) hereby certify that:

the ENGLISH documents for

Published Patent Document
DE 197 21 736 A 1
File Number 197 21 736.2

is a true and faithful translation from the original German language and that the professional translator is fluent in both the English and German languages.

May 9, 2002

Silect Translations & Communications

Creative Words To Live By

83 Bowerbank Drive, North York, Ontario, M2M 1Z9 • Tel: (416) 222-1756 Fax: (416) 222-5204

CA 02315462 2002-08-14

(70) FEDERAL REPUBLIC OF GERMANY

(German Eagle)

GERMAN PATENT AND TRADEMARK OFFICE

(12) **Published Patent Document**

(10) **DE 197 21 736 A 1**

(51) Int. Cl.[6]:

E 04 F 15/18

(21) File number: 197 21 736.2
(22) Filing date: 24.05.97
(43) Publication date: 26.11.98

(71) Registrant:

GABA-BAUSTOFF GMBH, 45527 Hattingen, DE;
JOMA Dämmstoffwerk, 87752 Holzgünz, DE

(74) Agent:

Schneiders & Behrendt, Solicitors and Patent Lawyers,
44787 Bochum

(72) Inventor:

Gastbauer, Friedhelm, 4489 Bochum, DE

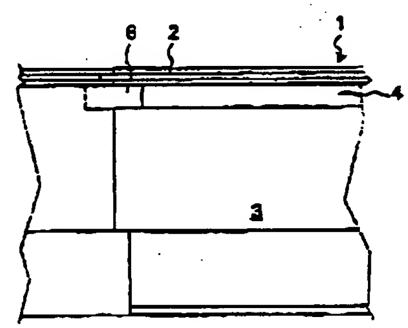
(56) Counter claims:

DE	25 08 628 C3
DE	88 00 710 U1
AT	39 40 67B
EP	03 57 921 B1

The following statements are extracted from the files submitted by the registrant
Examination request § 44 PatG is granted

(54) Barrier element

(57) The invention concerns a barrier element (1) with an overlay you can walk on (2) to the underside of which a continuous insulation sheet (3) is fastened, in which at least one surface has continuous open longitudinal ventilation channels (4) inserted. To obtain better moisture dispersion, which means a more even equalization in vapour pressure, and improved sound dampening, the invention suggests that, in addition to the longitudinal ventilation channels (4) perpendicularly placed cross ventilation channels (6) be inserted in at least one surface of the insulation sheet (3).



DE 197 21 736 A 1

Description

The invention concerns a barrier element with an overlay you can walk on, to the underside of which a continuous insulation sheet is fastened, in which on at least one surface has continuous, parallel, open, longitudinal ventilation channels inserted.

This kind of barrier element which can be developed as a floor or ceiling barrier component, as well as a dry coating element, is, as a rule, laid directly on the sub-floor as a thermal barrier and sound insulation in living and work areas. Even as the insulation function is provided for with an insulation sheet, for example, made of rigid foam such as Styropor® or one like it, the overlay bonded to the top is usually a composite wood sheet, which ensures that the periodic applications of weight, as for example, when stepping on the surface, are distributed evenly over the insulation sheet. On the overlay, commercial coverings such as carpeting or parquet can be laid.

Depending on the different usage made of the interior rooms, it can happen that in rooms one on top of the other there can be varying air humidity levels. As an example, the bathroom, kitchen, and bedroom are susceptible to a lot of humidity, whereas the living room and attic are relatively dry as a rule. Because moisture penetrates from below though the sub-floor, whereas the room above is relatively dry, or conversely, different moisture levels exist on the top and bottom of the overlay, these overlays, often formed of composite wood sheets, have the tendency with one-sided moisture seepage to curve on the damp side because of the presence of material swelling. This effect can also occur in cold temperatures where condensation can collect in the barrier layer, or unforeseen damp surfaces in the construction material. The commercial flooring set on the composite sheets usually acts as vapour barrier, so that another method needs to be found to disperse the humidity which has infiltrated the overlay, which means that an equalization in vapour pressure between the two sides of the overlay is created.

From DE25 08 628 C3 it is hereby made known, to insert lengthwise, continuous, groove-formed ventilation channels into the surface areas of the insulation sheet along which the air with its varying humidity levels can flow. At the front ends of floor surfaces laid out with such barrier sheets, the moisture can escape from the ventilation channels into the walls, or else into the surrounding air. In this way an equalization of moisture pressure is reached.

The above-mentioned implementation also has its drawbacks, however: the humid air can only be dispersed in the direction of the channels, i.e., the lengthwise direction. Should different humidity levels arise in the surface area, for example in the case of large attics which have rooms with varying moisture levels below, no equalization can occur among the separate parallel running ventilation channels. In addition, the moisture can only be drained from the front end, where these longitudinal channels come out.

From a technical standpoint. EP 03 57 921 B 1 establishes a better exchange method, adding an additional ventilation layer underneath the insulation layer, which is built with crosspieces in lattice formation separated from one another. It goes without saying that an additional ventilating layer would incur greater production and material costs.

The above-described problem gives rise to the purpose of the invention, to present a barrier element in the fashion described at the beginning, which, based on the described level of technical expertise provides improved moisture dispersion, that is a balanced equalization of vapour pressure, with a minimal manufacturing cost.

To solve this problem the invention suggests that cross ventilation channels be inserted in at least one surface of the insulation sheet in addition to the lengthwise ventilation channels in a transverse direction.

In conformity with the invention, the cross channels can essentially be developed similar to the already mentioned longitudinal channels. They can also be inserted into the top and/or bottom side of the insulation sheet. Vis-à-vis the known and proven forms of implementation, there is no additional expenditure in the manufacture and materials from a technical standpoint.

A special advantage of the invention's design is that in having cross channels between the individual lengthwise channels, an unimpeded exchange, that is an equalization in moisture level, can take place. In this way it is achieved that locally occurring higher moisture in the air, for example, above the bathroom, is quickly and evenly distributed over a large area. The same is true, naturally, for cool or warn condensation, as well as unforeseen wetness in the construction material.

Because of the exit openings of the additional cross ventilation channels on the longitudinal edges of a floor surface, a further advantage is realized in that the total volume of air expelled from the cross sections of the channels will be greatly increased and, in addition, dispersed into the room. This guarantees a more effective and more rapid equalization in vapour pressure. Besides, already minimal differences in vapour pressure ensure a reliable moisture exchange.

In addition to the improved equalization in vapour pressure, the design according to the invention has major advantages from the acoustic perspective as well as taking present technology into account. The sound dampening effect of the barrier sheet is influenced by the insulation material itself as well as the structural design of the barrier component. According to the invention, the barrier element because of the longitudinal and cross profiling throughout the ventilation channels. on the one hand diminishes the contact rigidity of the barrier material with the bearing, that is the covering sheet, and on the other hand, because of the cross channels, the longer transmission of sound is interrupted. This produces a clear improvement in sound absorption as well as reduced acoustical transfer.

It is furthermore advantageous for the longitudinal and cross ventilation channels to have a different width and/or depth. Because the longitudinal and cross channels have different measurements from each other, the dynamic rigidity of the barrier element is affected in a positive way and the acoustic path lengthened so that the sound insulation effect is further improved.

A preferred design of the invention provides for the top surface of the insulation sheet to have ventilation channels inserted with a greater depth than the ventilation channels on the underside of the insulation sheet. Because of this different design in the channel depth on the top and on the bottom, the harrier element according to the invention shows especially beneficial properties

with regard to moisture dispersion and sound insulation. Because the bottom channels have a fairly small depth, an especially good barrier effect is achieved. Even then any unforeseen moisture present in the construction itself or diffusing through the floor/ceiling can be effectively dispersed. In contrast the total condensation occasioned during a cold period, that is in the winter months, is dispersed through the top ventilation channels, where, under certain circumstances, the moisture accumulated in the underlying channels because of their smaller cross section also contributes. Thai is why it is particularly advantageous for the top ventilation channels to have a larger cross section, that is be greater in depth. The accumulated moisture has to be dispersed in an efficient manner, otherwise an unhealthy atmosphere will be created in the room, the barrier effect lessened, and, furthermore, the construction materials will be destroyed in the long run.

The dimensions of the longitudinal and cross channels on the top and bottom sides of the insulation sheet are for practical purposes determined by the anticipated loads and specifications.

The ventilation channels can have either a rectangular, a trapezoid or even a rounded entrance cross section.

For practical purposes the longitudinal and cross ventilation channels are designed so that they run at right angles to each other. This geometric configuration corresponds to the usual rectangular barrier elements, as well as the floors which are also mostly rectangular. Certainly, individual barrier elements to accommodate given floor areas, can also be in a trapezoid, rounded or deviant form.

A particularly advantageous further development of the invention provides for the cross ventilation channels to be inserted on the face of the insulation sheet with grooves open at the side. With this design of the barrier element, at least one continuous edge of the front side of the insulation sheet is left open in the cross direction in which the exit openings of the longitudinal channels are found. Even if only one edge is furnished with cavities open at the side in this manner, because of two adjacent barrier elements, a closed cross channel is formed. Preferably openings are arranged on two opposing edges so that offsetting them can be done more flexibly and result in a larger entrance cross section. The special advantage with this design is that the cross channels in conformity with the invention can be made at very little manufacturing cost. A further advantage is that the entrance cross section of the cross channels is not affected even with offsetting the individual barrier elements against each other in a cross direction. The function according to the invention is ensured in any case.

As a result of the ventilation channels being wider than the respective crosspieces situated between them, even if the individual floor barrier elements are offset against each other, the entrance cross section of the ventilation channels cannot be blocked by the crosspieces.

Usually the insulation sheet is made of Styropor®, that is polystyrene foam, and the overlay is a composite wood sheet. The design according to the invention is not limited to this combination of materials but has the advantage of being adaptable to other materials. Thus the insulation sheet can, for example. consist of rock and mineral wool, PU-foam, soft fibre or lignin material. For the overlay any imaginable sheets of made of wood, plaster or plaster composite can be used.

An example of an implementation design of the invention is described more closely in the drawings following. They show in detail:

Fig. I a side view of a floor barrier component in a longitudinal/lengthwise direction

Fig. 2 a side view of the floor barrier component in a cross direction

Fig. 1 shows a view of a barrier element 1 in a lengthwise direction, which in this view is representative of the already familiar floor barrier components. It mainly consists of a composite wood sheet 2, which serves as an overlay that you can walk on, as well as a continuous insulation sheet 3 made of rigid foam, i.e., Styropor®, adhered to the underlying surface in one piece.

The composite wood sheet 2 is furnished on its outside edges with a continuous tongue and groove junction. The insulation sheet 3 is also furnished, on its side edges, with gradations, i.e., breaks, which prevent heat bridges from forming between neighbouring elements 1.

In both the top as well as the bottom surfaces of the insulation sheet 3 open longitudinal channels 4 with mainly rectangular cross sections are inserted in each case in the direction of the surface. These are respectively wider than the material crosspieces situated in between.

Fig. 2 shows two adjoining barrier elements 1 in accordance with Fig. 1 in a 90° turn lateral view, that Is in a cross direction. It is thereby visible that on the face of the insulation sheet, on the top edge, is a groove open on the side, which forms a cross channel 6 in accordance with the invention. This channel flows at right angles to the longitudinal channels 4 and 5 and respectively connects these at the front of a barrier element.

It is evident that an inserted, laterally open cross channel 6 on one side of an insulation sheet is already enough to realize the invention. It is, however, expedient to have cross channels 6 inserted on both front sides across from each other, as then the entrance cross section is correspondingly larger in a cross direction.

The already mentioned advantages attributed to the invention, such as a better and more even dispersion of moisture, is *(sic)* always guaranteed when utilizing the barrier elements 1, in accordance with the invention, true to their design, in conformity with the invention.

Patent Claims

1. A barrier element with an overlay you can walk on, under which a continuous insulation sheet is fastened, in which at least one surface has continuous, open longitudinal ventilation channels inserted, characterized in that in at least one surface of the insulation sheet (3), in addition to the longitudinal ventilation channels (4) in a transverse direction to these, cross ventilation channels (6) are inserted.

2. Barrier element according to claim 1. characterized in that the longitudinal and cross ventilation channels (4,6) have a different width and/or depth.

3. Barrier element according to claim 1. characterized in that on the surface of the insulation sheet (3) the built-in ventilation channels (4,6) are deeper than the ventilation channels on the bottom of the insulation sheet (3).

4. Barrier element according to claim 1. characterized in that the longitudinal and cross ventilation channels (4,6) are perpendicular to each other.

5. Barrier element according to claim 1. characterized in that the cross ventilation channels (6) are built out like the front edges of the inserted laterally open grooves of the insulation sheet (3).

6. Barrier element according to claim 1. characterized in that the ventilation channels (4,6) are wider/broader than the crosspieces (5) respectively situated between them.

7. Barrier element according to claim 1, characterized in that the insulation sheet (3) consists of Styropor®.

8. Barrier element according to claim 1, characterized in that the insulation sheet (3) consists of rock, i.e., mineral wool.

9. Barrier element according to claim 1, characterized in that the insulation sheet (3) consists of synthetic foam.

10. Barrier element according to claim 1, characterized in that the insulation sheet (3)consists of a fibre sheet.

11. Barrier element according to claim 1, characterized in that the overlay (2) is a composite wood sheet.

12. Barrier element according to claim 1, characterized in that the overlay (2) is a fibre sheet.

13. Barrier element according to claim 1, characterized in that the overlay (2) consists of plaster.

Attached 1 page(s) of drawings

CA 02315462 2002-08-14

- Blank Page -

DRAWINGS PAGE 1

Number: DE 197 21 736 A1
Int. Cl.[6]: E 04 F 15/18
Publication Date: November 26, 1998

Fig.1

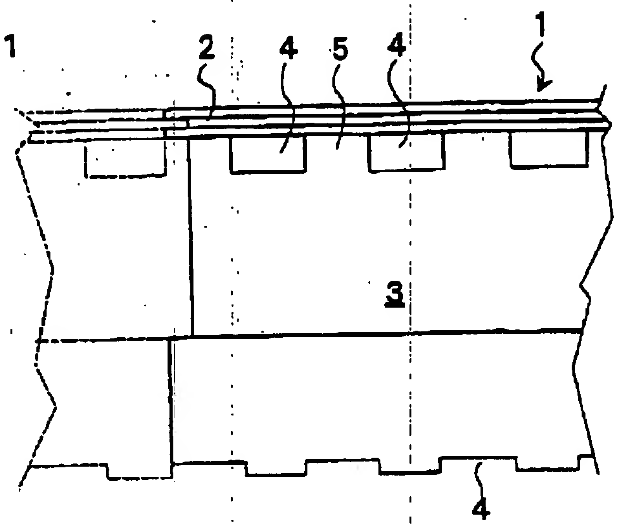


Fig.2